Viewpoint

Air Power and Agility

By Gp Capt Ian Shields[1]

An agile, adaptable and capable Air Force, that person for person, is second to none, and that makes a decisive air power contribution in support of the UK Defence Mission.

The Royal Air Force Vision
Quoted in AP 3000, 4th Edition, p.5.

Air power is the most difficult of military force to measure or even to express in precise terms. The problem is compounded by the fact that aviation tends to attract adventurous souls, physically adept, mentally alert and pragmatically rather than philosophically inclined.

Sir Winston Churchill
Quoted in AP 3000, 4th Edition, p. 13.

Introduction

What is air power? In a previous article[2] I have argued that we have not yet produced a true air power strategist, but perhaps more fundamentally than that, what do we understand by the term "air power"? As Churchill says in his oft-used quote above, it is the most difficult to measure or define precisely, while this lack of clarity of understanding can in part be explained by the sort of people Churchill claims we, air power practitioners and proponents, are: more inclined to pragmatism than philosophy - and, I would add, inherently technically minded (for it is only through technology that we can fly). Professor Colin Gray wrote in 2005 that "… we still do not have a satisfactory theory of air power"[3], quoting in turn David MacIsaac:

"*Air power, the generic term widely adapted to identify this phenomenon (the use of aircraft in war), has nonetheless yet to find a clearly defined or unchallenged place in the history of military or strategic theory. There has been no lack of theorists, but they have had only limited influence in a field where the effects of technology and the deeds of practitioners have from - the beginning played greater roles than ideas*"[4].

Go back a decade or so and we all chanted the mantra that *flexibility is the key to air power* which, indirectly, goes some way to explaining how air power is employed, and therefore hints at what air power *is*. This statement does not, however, go far enough, and it is noticeable that we now regard flexibility as a sub-set of agility. Indeed, in the present RAF Vision we see the idea of flexibility being taken one step further forward with the idea that it is, and therefore Air Forces are, inherently *agile*. By exploring what makes Air power, as opposed to Maritime or Land power, unique not only do we get closer to answering the philosophical question of what air power is, but also - and

arguably more importantly as it is more practical - how we can best exploit its very uniqueness.

Accepting, then, that agility as at, or very close to, the core uniqueness of air power, what do we understand by agility? The new edition of AP 3000 identifies agility as one of the six fundamental strengths of air power[5], before going on to assert that agility itself comprises five strands: responsiveness, flexibility, resilience, adaptability and acuity[6] . This article will build on the (necessarily) short reference to agility in AP 3000 by exploring further the notion of agility and how it relates to air power in order to contribute to the wider debate on the meaning of air power. To do so, it will first look briefly at the notion of agility before considering how each of the individual aspects of agility identified in AP 3000 relate to air power. It will then discuss how agility can be used as way of balancing strengths and weaknesses before concluding.

Air Power and the Five Strands of Agility

Agility, taken as an entire concept, is a little like time: we all know what it is but find it difficult to define. It is important to recognise that agility is primarily a state of mind and an approach to problem solving: it is this aspect of agility on which we should concentrate rather than on the physical attributes of aircraft and other air-breathing platforms possessing agility, necessary though such an attribute might be. But to develop an attitude of mind that is not only itself inherently agile, but can in turn produce agile solutions to problems, requires both training and a broader, widening educative approach that is somewhat counter-intuitive to the military mind. How, though, do the five strands of agility relate to air power?[7]

Responsiveness. Air power is, inherently, highly responsive. Aircraft are, compared with ships or regiments, relatively easy to maintain at very high readiness which offers a degree of agility not available to our Maritime or Land colleagues. Moreover, with their speed, aircraft can transit much quicker, delivering or threaten to deliver air power rapidly. This high responsiveness of air power can make it attractive for politicians, especially as it also represents a limited political commitment, especially when offering a reduced ground footprint. Furthermore, aircraft on task can respond rapidly to developing situations on the ground (or on the surface of the sea): one only has to think of the close air support requests from troops in contact in Afghanistan to recognise the responsiveness of Air power. However, speed itself should always be seen in the context of a specific situation, not as an absolute virtue. Speed does offer commanders at all levels the ability to bring influence to bear quickly, be that reassuring presence, humanitarian relief or attack; all at long range and in time. This makes air power useful for initial crisis management. But, in recognising air power's intrinsic strengths we must also have the confidence to accept its limitations: it is never a panacea and has two significant limitations. First, when moving materiel to a crisis zone, air power has limited lift compared with surface means. Airlift exploits speed

and reach, but trades off mass; this allows pragmatic policy options[8] . The second limitation is impermanence, although this is being addressed to a degree by unmanned aircraft, and can be offset by air refuelling. Moreover, technological advances suggest that impermanence, often regarded as the Achilles' heel of air power, may be significantly reduced within the next 20 years[9] .

Flexibility. Flexibility allows for people, units and platforms to switch roles without major re-training or re-configuration when faced by the unexpected or by changes in anticipated activity. In addition, it assists in mitigating system failure or the results of enemy action, in providing a measure of redundancy. Aircraft are reasonably flexible, although they are invariably configured towards one broad role. However, at the design stage more and more flexibility is being introduced - it is worth recalling that the original name for the Tornado was the Multi-Role Combat Aircraft. Moreover, the JCA is likely to be an excellent ISTAR platform, because its suite of sensors will relay their information without the pilot even being aware of what it is doing. Meanwhile, the Reaper Unmanned Air Vehicle demonstrates where this flexibility, aided by technology, may be leading with the old stovepipes of surveillance and attack increasingly being broken down. There is, though a down-side to advancing technology, and that is unit cost: as platforms become fewer and more expensive, albeit more able, flexibility becomes more difficult. The effect of mass will be considered further under the next heading, resilience. However, we must generate, through training, flexible thinking in our people for we must be alive to the loss of flexibility that technology and cost between them suggest. Fortunately, it is not just platforms that are flexible, air-minded people, for the very reasons Churchill spelt out in the quote at the beginning of this article, are flexible. Mankind is at ease operating in a two-dimensional world, be that the surface of the land or of the sea, but adding the third dimension of height requires a different perspective on the world, one that, combined with the speed at which we are accustomed to operate and therefore our different perception of time, the fourth dimension, requires a more flexible approach.

Resilience. Air platforms are, by their nature, fragile. They must be light enough to defy gravity and from the earliest days of aviation we have sought lighter and stronger structures. Air platform fragility, both of the ground and in the air, can be partly addressed by height, speed, defensive aids and stealth (in harmony, not isolation) but with unit costs rising and platform numbers declining, attrition directly impacts resilience. Indeed, in terms of resilience here lies the conundrum: we can make platforms more resilient by making them more survivable thanks to technology, but that makes them more expensive, and fewer in number (witness the recent US decision on F-22 numbers[10]). That in turn makes the loss of any single platform more significant and, with replacement for both the platform (limited capacity to manufacture and long build times due to the technological challenges) and, for manned aircraft, the operator (aircrew training is now measured in years), decreases resilience. Mass, of course,

has a resilience all of its own, and the time may be drawing close when we need to have a debate over whether we should have large numbers of low-technology platforms (perhaps unmanned) or a very few high technology aircraft?[11, 12] . However, with our traditional love-affair of technology it is more likely that we will continue the trend towards more complex solutions and have to accept ever fewer platforms - even Unmanned Air Systems such as Predator are increasing rapidly in unit cost as we demand ever more of them. The greatest need for increased resilience, though, is mental. In particular, we have become accustomed to very low casualty rates and the loss of just a single platform, as alluded to above, may have strategic impact. Indeed, we are at a historically low point for losses from peace-time flying training accidents and have experienced mercifully few losses on recent operations. We should be alive to this trend, and not only guard against any assumption that we will never again face large-scale losses, but ensure that our political masters are aware of the impact that even relatively small losses of scarce and precious resources could have.

Adaptability. Allied to flexibility and resilience is the need to be adaptable in the face of the unexpected. Unlike flexibility, where our modern platforms can be re-roled by design, technology counts against adaptability: it is becoming less common that we can *rapidly* adapt our sophisticated aircraft to new roles. Instead, the adaptability that we need to generate and retain is mental: we need to have the ability to recognise when our opponent has gained the initiative, and have the ability to respond; a key requirement for all military practitioners. Air power practitioners have, traditionally, been good at adapting, but the constraints of fighting limited wars (with their emphasis on legal/ethical considerations) and the constraints of airspace control mechanisms (the Air Tasking Order has, perforce, driven air power employment) have offered limited opportunities for the full gamut of the flexibility of air power to be exploited. Future trends, such as increasingly centralised control (particularly political) and the advent of the Virtual Knowledge Bases (with networked data solutions offering algorithm-derived solutions that inadvertently constrain thinking: the solution being driven by the writer of the algorithm writer and tempting the commander to use that rather his own intuition[13] is likely to exacerbate this tendency. Education is again the key, and both Commanders and the practitioners of air power must remain alive to its inherent adaptability and guard against those trends that risk reducing this fundamental strength.

Acuity. Acuity, the sharpness and acuteness of understanding[14] , are implicit in the best employment of air power. However, this requires a deep understanding of air power at all levels; such understanding can only come about through exposure to air-minded proponents, education and deep thinking. The development of the required depth of understanding must be gained, it is not an inherent ability. Of the five strands of agility this is the most difficult to articulate and therefore reduce to a balance-sheet style argument: it requires investment in

a conceptual rather than a physical field, the results of which are more difficult easily to identify. And yet it is also the most important for only by developing air power practitioners, proponents and commanders with the required insights into its agility will we exploit air power's tremendous potential into action.

Agility - Balancing Strengths and Weaknesses

While agility is an inherent property and strength of air power, we must recognise and accept that agile Air power alone will never be a panacea. The future operating environment is arguably more uncertain than ever, and we have witnessed in both Iraq and Afghanistan the rapid adaptability of our adversaries to UK concepts, doctrine and capability. Air power is on the one hand inherently agile; however, on the other we must constantly assess not just any campaign but the wider piece to ensure that we are aware of developments and can respond: this requires agility but also will allow us to retain our agile advantage.

Air power must be able to attack critical target sets to unhinge an adversary's will or ability to resist. Opportunities will exist in future to achieve physical and coercive effects that are out of proportion to the modest effort required for attacks; the advent of novel weapon technology will only assist in this endeavour. However, identifying these effects will require a depth of analysis that may not be possible in the time available: we will, for example, rarely fully appreciate how an adversary makes policy decisions, or how an economy, society or individual and collective psychology of enemy leaders and citizens works. Trying to understand an adversary is the right approach[15], but trying scientifically to model behaviour and the effects of air power applied against key nodes would be folly; the effects based approach can only be taken so far[16]. Good air power strategies are agile, where the best assessment is made in the time available, where people are willing to learn and where strategy is adjusted based on the observed effects and events. The ability to sense and respond to what unfolds is crucial: this is how air power can adapt, and how its strategists can learn, gain deeper insights into their adversaries and retain the initiative. It is all a question of balance: failing to inflict the damage called for by the initial strategy, or abandoning a sound strategy before it has time to work, are problems that an astute strategist considers. Selecting and maintaining the aim will always be apposite, but as allegiances shift and centres of gravity change, so too must end states, and the means adopted to achieve them. This, then, is agility, and with broad education, constant re-assessment and an innate knowledge of both the strengths and weaknesses of air power, air power practitioners and proponents can exploit this inherent agility to considerable effect.

Conclusion

Air power is still, I contend, neither fully understood nor adequately articulated as a concept. But by considering what makes Air, as opposed to Maritime or Land, power unique we can get closer to an understanding of its inherent nature, and by doing so enable us to be better placed to exploit its

strengths and avoid its weaknesses. Air power remains a young capability and this youthfulness allows we, its practitioners, to be open-minded. We are inherently technical in our outlook, and this willingness both to embrace new ideas and exploit new technology are themselves symptomatic of the inherent agility of air power. We must always acknowledge air power's weaknesses and limitations, particularly its impermanence and fragility, but by making full use of its strengths we can ensure that we deliver the maximum capability and achieve the greatest effect. Agility is at the core of air power, and by better understanding the five strands of agility (responsiveness, flexibility, resilience, adaptability and acuity) we increase our knowledge and understanding of this most difficult of military capabilities to define - but the capability that simultaneously offers the greatest potential.

Notes

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[2] APR Volume 11 No 1 Spring 2008, pp. 1 - 5.

[3] Colin S Gray, *Another Bloody Century: Future Warfare* (London: Weidenfeld and Nicholson, 2005), p. 319.

[4] David MacIsaac, 'Voices From The Central Blue: The Air Power Theorists', in Peter Paret, ed., *Makers of Modern Strategy: From Machiavelli to the Nuclear Age* (Princeton, New Jersey, 1986), p. 624.

[5] AP 3000 4th Edition, p.17.

[6] The current edition of *The High Level Operational Concept* lists the same five strands of agility, albeit in a slightly different order (responsiveness, resilience, flexibility, acuity, adaptability). See T*he High Level Operational Conceptual Commentary* pp. 1-7 - 1-8.

[7] This is not to say that Maritime or Land Power are not also agile - and it should be remembered that an enemy will also be agile, as we are witnessing today in Afghanistan. But where Airpower has the edge in agility over Maritime or Land Power is that, due to the flexible and responsive nature of air platforms, its *employment* is inherently agile - at least when employed imaginatively.

[8] Another issue often quoted as a major drawback of air power concerns Access, Basing and Overflight (ABO) acting as a significant limitation of air Transport. However, the reality has been that employment of UK air power has invariably been consistent with the legal and moral justification held by the states neighbouring the zone of crisis and Host Nation Support (HNS) has rarely proven to be a issue.

[9] See the recently published *Future Air and Space Operating Concept 2009* for more detail.

[10] The F-22 is widely acknowledged as the most advanced fighter aircraft in the world, but at a reported unit cost of $US143 *each* - or about 2/3 of the cost of a cheap naval Frigate. A combination of unit cost and changing requirements have limited the US buy. See: **http://online.wsj.com/article/SB123490303268502611.html**.

[11] One RAND study has predicted that by 2054 the *entire* US Defence Budget

would be able to buy just one aircraft, such is the cost growth of technology. See the Future Air & Space Operating Concept 2009 (FA&SOC 2009), p. 1-4 for a longer explanation of the impact of technology inflation on air and space platforms.

[12] There, is however, nothing new in this debate: when undertaking the then Weapons Employment Course in the mid 1980s (at the height of the cruise missile deployment to Greenham Common and Molesworth)
I recall a British Aerospace representative arguing that we could replace all our Harriers, Jaguars and Tornados in Germany with shipping containers full of cruise missiles. The suggestion was that these missiles, conventionally rather than nuclear armed, would swamp the Warsaw Pack air defence network and enough missiles would get through, with no loss of scarce aircrew lives, to achieve the same effects that the manned aircraft fleets could. A somewhat tongue-in-cheek argument, as any increase in resilience would be more than offset by the decrease in flexibility, not to mention a concern that the missiles could be interpreted as being nuclear-armed, thereby triggering Armageddon. Nevertheless, as a concept worthy of note.

[13] For more detail see FA&SOC 2009, especially paragraphs 226 - 237.

[14] Concise Oxford Dictionary.

[15] "Know the enemy, know yourself; your victory will never be endangered.
Know the ground, know the weather; your victory will be total". Sun Tzu, *The Art of war*, Chapter 10.

[16] The Israeli offensive against Hezbollah in Southern Lebanon in 2006 is testament to the dangers of taking an effects based approach too far.